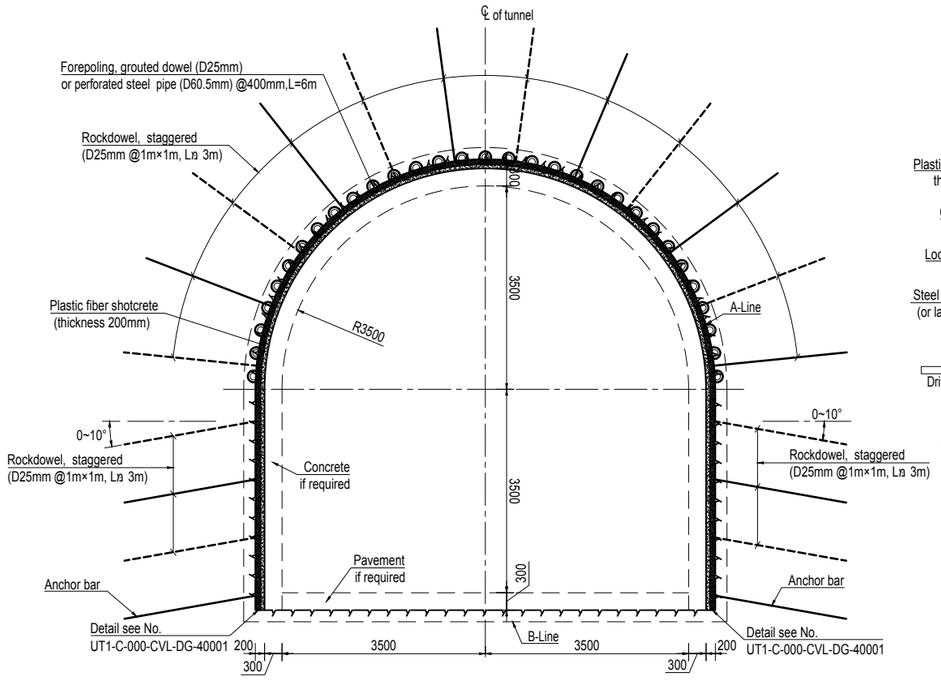
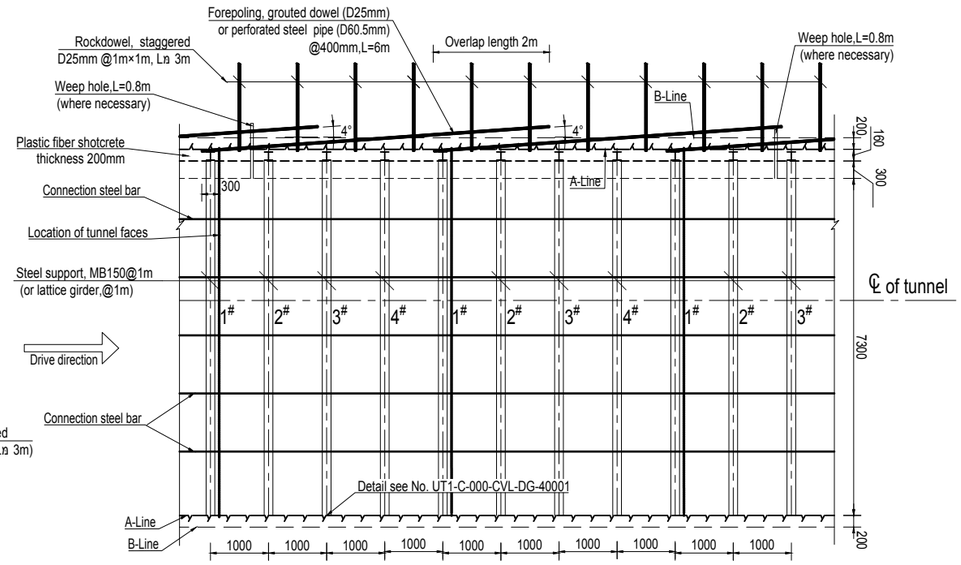
ACROSS SECTION OF FOREPOLING
(Applied to Rock Class V) 1:50



LONGITUDINAL SECTION OF FOREPOLING
(Applied to Rock Class V) 1:50



NOTE: (1)The gaps behind the steel ribs need always be filled with shotcrete and/or concrete, not with rock blocks.
(2)The excavation profile may need to be adjusted to a "saw-tooth profile" and size of ribs/girders may also be adjusted.

TUNNEL SUPPORT PATTERN

Rock mass quality	40≥Q	10≤Q<40	4≤Q<10	1≤Q<4		Q<1
Support type	I	II	III	IV (Without steel support)	IV (With steel support)	V Same as type IV (With steel support)
Inner dimension(m)	W=7m, H=7m					
	Excavation Parameter					
ESR	1.3	1.3	1.3	1.3		1.3
Excavation span(m)	3	3	2	1.5		0.5~1
Calculated MUS*(m)	11	9	5	3		1
MUS* for shotcrete application(m)		9	2	1.5		1
MUS* for rock dowel installation(m)		6	4	3		0.5~1
MUS* for steel support installation(m)				0.5~1.0		0.5~1
Excavation method	Blasting			Blasting/mechanically		Mechanically
Initial support parameters						
Weep hole, Φ50mm,L=0.5m / 0.8m	where necessary					
Plastic fiber shotcrete,f'c=25MPa	T=50mm	T=50mm	T=100mm	T=100mm	T=160mm	For class V rock, the same support scheme as class IV rock can be adopted after grouting is used to improve the integrity and firmness of surrounding rock.
Rock dowel, D25,L=3m,alternately	Spot	@2.5m×2.5m	@2m×2m	@1.5m×1.5m	@1.0m×1.0m	
Steel support, MB150 (or lattice girder)					@1m	
Forepoling grouted dowel,D25mm, @400mm, L=6m					where necessary	
*MUS Maximum Unsupported Span.						

Scale 1:50 0 0.5 1 1.5 2 2.5m

NOTE
1. All dimensions are in millimeters, and coordinates, chainages & elevations are in meters.
2. Other notes please refer to sheet 1.

REFERENCE DRAWINGS

UT1-C-000-CVL-DG-40001	Detailed Design Drawing of Excavation and Support for Underground Cavern
UT1-C-060-CVL-DG-43001	Layout Drawing of Work Adit for Steel Penstock Tunnel
UT1-C-090-CVL-DG-64001	Layout of Access Tunnel to Powerhouse

SYMBOL AND LEGEND

FOR APPROVAL

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REV. NO.	DATE	DESCRIPTION	DRAWN	CHKD.	APPD.
0A	15.JUN.2022	First issue	Han Y.H.	Lei Y.G.	Luo L. Zhou L.S.

PROJECT TITLE
Upper Trishuli-1 HEP (216MW)

OWNER
NWEDC NEPAL WATER AND ENERGY DEVELOPMENT CO. PVT.LTD.

OWNER'S ENGINEER
TRACTEBEL ENGIE
jade CONSULT

CONTRACTOR
DOOSAN Enerbility

DRAWING TITLE
Excavation and Support Drawing of Work Adit for Steel Penstock Tunnel

INDEX	DRAWING NUMBER	SHEET NO.	REV. NO.
A	UT1-C-060-CVL-DG-43002- 02	2 OF 3	0A

A1 (594 x 841 MM)